

WHAT IS CLAIMED IS:

1. A coil tubing injector assembly comprising:
a frame structure for mounting above a wellhead; and
at least one gripper chain drive system mounted to
the frame structure and having a plurality of
opposed gripping blocks adapted to grip at least
one of at least three differently-sized coil
tubing strings for injecting the coil tubing
strings into and extracting the coil tubing
strings from a subterranean well.
2. The assembly as claimed in claim 1 wherein each
gripping block comprises at least one gripping
surface adapted to grip one of the plurality of coil
tubing strings.
3. The assembly as claimed in claim 2 wherein the
gripping surface is concave.
4. The assembly as claimed in claim 3 comprising a
single gripper chain drive system having a pair of
opposed gripper chain drives, each gripper chain
drive including a plurality of substantially
identical gripping blocks.
5. The assembly as claimed in claim 4 wherein the
gripping blocks have at least three gripping
surfaces.
6. The assembly as claimed in claim 5 wherein each
gripping block has three differently-sized gripping

surfaces for gripping at least one of three differently-sized coil tubing strings.

7. The assembly as claimed in claim 5 wherein each gripping block has four differently-sized gripping surfaces for gripping at least one of four differently-sized coil tubing strings.
8. The assembly as claimed in claim 5 wherein each gripping block has five differently-sized gripping surfaces for gripping at least one of five differently-sized coil tubing strings.
9. The assembly as claimed in claim 3 comprising at least three independently drivable gripper chain drive systems, each gripper chain drive system having a pair of opposed gripper chain drives, each gripper chain drive system having a plurality of substantially identical gripping blocks.
10. The assembly as claimed in claim 9 wherein each gripping block has a single gripping surface.
11. The assembly as claimed in claim 10 comprising three gripper chain drive systems each having a differently-sized gripping surface.
12. The assembly as claimed in claim 10 comprising four gripper chain drive systems each having a differently-sized gripping surfaces.
13. The assembly as claimed in claim 10 comprising five gripper chain drive systems each having a differently-sized gripping surface.

14. The assembly as claimed in claim 1 wherein the at least one gripper chain drive system comprises a pair of opposed gripper chain drives, each gripper chain drive having a drive sprocket mounted to a drive shaft, each drive shaft being coupled to a motor whereby the drive shafts of the opposed gripper chain drives are rotated at a same angular velocity but in opposite rotational directions.
15. The assembly as claimed in claim 14 wherein each gripper chain drive further comprises:
an idle sprocket mounted to an idle shaft; and
a gripper chain engaged with the drive sprocket and the idle sprocket, the gripper chain having the gripping blocks attached around an outer periphery of the gripper chain.
16. The assembly as claimed in claim 15 wherein each gripper chain drive further comprises a pressure beam supported by the frame structure and movable with respect to the frame structure, the pressure beam being adapted to support the gripper chains while the gripper chains grip the coil tubing string.
17. The assembly as claimed in claim 16 further comprising a roller chain system operatively mounted to the pressure beam for reducing friction between the pressure beam and the gripper chain.
18. The assembly as claimed in claim 21 wherein the pressure beam is connected to an actuator mounted to the frame structure for moving the pressure beam.

19. A method of injecting or extracting one of at least three differently-sized coil tubing strings into or from a subterranean well using a single coil tubing injector, comprising the steps of:
 - gripping at least one of the at least three differently-sized coil tubing strings with at least one of at least three differently-sized gripping surfaces formed on gripping blocks attached to opposed gripper chains; and
 - driving the opposed gripper chains at substantially the same angular velocity in opposite rotational directions to inject or extract the at least one of the at least three coil tubing strings into or from the well.
20. The method as claimed in claim 19 further comprising a step of actuating pressure beams to force the gripping surfaces of the gripper chains against the at least one of the at least three coil tubing strings.